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ABSTRACT

A study examined and specified the effects of selected variables on adults' reading strategies and comprehension. Subjects, 20 adults in an adult basic education group, 20 students in a "high-risk freshmen" group, and 18 students enrolled in a senior level reading methods course, were administered an informal reading inventory (IRI), an intelligence test, and a self-report interview. The three subject groups differed in reading ability. Miscue patterns were analyzed on the IRI in terms of syntax, semantics, and graphophonics. Comprehension data were gathered for passages read on the IRI. Interview data were analyzed for reader's familiarity with IRI passage topics, interest in IRI passage topics, and familiarity with IRI passage writing style. Regression analyses procedures were used to explore the amount of variance associated with reading strategies noted on the IRI and comprehension of IRI passages and 13 predictor variables, including text length, content, and readability. Results indicated that: (1) miscues varied as a function of a combination of many factors; and (2) readability of a selection to a specific reader provided the most variance in the production of miscues. Findings suggest that miscues are influenced by the interaction of text and reader variables. (Eight tables of data are included; 42 references are attached.) (RS)

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Sources of Variance Influencing Adults' Reading Strategies and Comprehension

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ABSTRACT

Sources of Variance Influencing Adults' Reading Strategies and Comprehension

Three groups of adults differing in reading ability were administered an informal reading inventory (IRI), an intellegience test, and a self-report interview. Miscue patterns were analyzed on the IRI in terms of syntax, semantics, and graphophonics. Comprehension data were gathered for passages read on the IRI. Interview data were analyzed for reader's familiarity with IRI passage topics, interest in IRI passage topics, and familiarity with IRI passage writing style. Regression analyses procedures were used to explore the amount of variance associated with reading strategies noted on the IRI and comprehension of IRI passages and the predictor variables: text length; interest; familiarity with style, content, and author's style; bilingualism; reading maturity; non-verbal and verbal intelligence; concept of reading, group membership, time engaged in reading weekly; and readability. Results of this study supported many of the findings of miscue analysis research that studied children's reading behavior. Miscues varied as a function of a combination of many factors. Readability of a selection to a specific reader provided the most variance in the production of miscues. The study supported the hypothesis that miscues are influenced by the interaction of text and reader

variables. Readers tended to rely more heavily on the context of the reading selection to provide meaning as the progressed through the text.

Investigations of adult readers' strategies for decoding and comprehending text most often use self-reports of strategies employed during and following the reading process (Hare,1981). Several behaviors have been noted as influencing reading strategies employed by adult readers. For example, linguistic and non-linguistic context and the knowledge, expectations, and purposes of the reader (Tierney, Mosenthal, & Kantor, 1980) have been shown to be variables associated with text processing. The bulk of the recent research with adult readers has dealt with either text recall, such as the reader's purpose (e.g., Frederiksen, 1975; Rothkopf & Billington, 1979) and comprehension monitoring (e.g., Baker & Brown 1984; Baker & Anderson, 1982; Flavell, 1981), or text structure, such as passage clarity (e.g., Bransford & Johnson, 1972; Schallert, 1976) and text organization (e.g., Mandler & Johnson, 1977; Shebilske & Fisher, 1981). There have been few empirical studies of adult readers' word recognition strategies development and its effect on comprehension in relation to text difficulty. The bulk of the investigations in the examination of miscue variance among readers has been conducted with children (e.g., Goodman, 1978; Rousch, 1972; Whitmer, 1979). Relying on evidence from these studies with children to generalize to adult reading behaviors results in a serious threat to external validity. Several studies have shown that there are differences between adults and children that warrant the seperate investigation of the reading behaviors of the two populations. Fay (1964) noted that a voluntary adult learner will be more motivated than children

because adult learners are highly goal oriented. A primary consideration of how adults differ from children is the notion that the experiental base of adults makes their learning different from that of children (Kidd, 1976). Adults and children often integrate their old and new knowledge; however, children do not posses the same awareness of what they do and do not know (Schallert, 1980). If the reading process requires readers to use their knowledge of language and the world around them, then experience would seem to function differently in adult readers' use of strategies as compared to strategies utilized by young children.

Some miscue analysis studies have been conducted with adult readers. Two studies (Borak, 1978; Raisner, 1978) investigated the reading strategies of non-proficient adult readers. Adults in the Borak (1978) study utilized semantic cueing systems less than children performing at a third grade reading level, but produced higher retelling scores than children at similar reading development levels. Adults in Raisner's (1978) investigation relied heavily on graphophonic cue systems similar to what had been found with children when material was difficult. However, adults were unable to utilize syntactic cues as effectively as children who were at similar reading levels. Evidence from a large number of children's miscue studies support the idea that the majority of their miscues tend to be syntactically acceptable (Burke, 1976; Goodman, 1976; Menosky, 1971; Wixson, 1979). However, the above noted studies with adult readers suggests that beginning level adult readers may differ in their use of

syntactic and semantic cueing systems when compared to children. There is also support for the idea that syntacticlly acceptable miscues consistently surpass semantically acceptable miscues by 20 percent and the proportion of both types of miscues tend to increase as readers become more proficient (Wixson, 1979).

While it has been shown in the study of children's reading behaviors that their world knowledge, monitoring strategies, purposes, and word recognition strategies affect comprehension, it seems likely that beginning and capable adult readers will differ from children in their use of such reading strategies. Therefore, the external validity of results obtained from studies of children's reading is limited and characteristics of adult readers could have a signficant impact of their use of word recognition strategies and comprehension of text.

The purpose of this research was to examine and specify the effects of selected variables on adults' reading strategies and comprehension. It seems logical that many of variables that have been examined with children should be examined with adults as well, thus, a major purpose was to examine the many possible sources of variance for producing miscues in adult readers at differing levels of reading proficiency. Studies cited earlier revealed that as children improved their reading proficiency, their strategies changed. It is important to also investigate adults at different stages and in different educational settings to explore the effects of reading maturity and social and cultural settings of instruction on their use of reading strategies.

Adult readers' attention to task and interest in the content of what they are reading are two factors considered in this

study. Anderson, Goldberg, and Hidde (1971) in a study using adult subjects concluded that accurate and fast decoding are not enough to insure comprehension. In studying the reading behavior of military jobholders, Sticht (1971) found that several workers still successfully read printed materials that were five or six grade levels above their average skill level when they read for information. Also, the closer the match between reading ability and readability of the text, the more the worker used the printed materials for information. Thus, we were interested in whether interest in the reading materials would enable adult readers at varying levels of reading proficiency to handle more sophisticated material than their reading competency level would indicate.

In summary, the present study had the purpose of using miscue analysis to examine the variance associated with adult subjects' (1) semantic cueing system, (2) syntactic cueing system, (3) graphophonic cueing system, (4) miscues that result in loss of meaning, (5) corrected miscues, (6) corrected miscues that had resulted in earlier meaning loss, (7) literal comprehension, (8) inferential comprehension, and (9) critical comprehension. The predictor variables of interest were text length, readers' familiarity with text content, readers' familiarity with author's writing style, readers' interest in th;e passage, bilingualism, intelligence, hours spent reading per week, conceptualization of the reading process, and readability of text read.

Method

Subjects

There was a total of 58 subjects in the study and each subject was assigned to either the adult basic education group (ABE), high risk freshman group (HRF), or the senior education majors group (SEM).

The twenty subjects in the ABE group were currently enrolled in an adult basic education program in a six county Adult Education Cooperative in a rural area of south central Texas. Seven teachers were asked to identify students reading below an instructional eighth grade level who had been enrolled in the instructional program for at least one month.

Subjects in the HRF group were selected from students enrolled in a Psychology of Effective Learning course at a southwestern Texas University. Students are required to take this course due to either a low grade point ratio in high school or college, or because their performance on the American College Testing Program entrance exam did not meet the criterion established by the university. These students were considered to be high risk for a university setting. The content of the course is geared toward improving their reading and study skills. Two weeks into the fall semester, teachers were asked to identify students who were having the most difficulty in reading based upon performance in class reading activities and the McGraw-Hill Basic Skills System Test (Raygor, 1970). Each student's comprehension score had to be less than the thirtieth percentile for inclusion in the study. Twenty students enrolled in this

course were selected for inclusion in the study.

Twenty students enrolled in a senior level reading methods course at a southwestern Texas State university agreed to participate in the study. It was assumed that if a student had progressed through three years of college, the student was a more capable reader in relation to the other two groups. Due to attrition, only 18 complete data sets were obtained from this SEM group.

Materials

The researchers found it necessary to develop an informal reading inventory for the purpose of data collection because none of the available instruments was deemed suitable for several reasons: (a) range of grade levels represented was not adequate, (b) passage length was too short to generate a sufficient number of miscues for analysis, (c) topics were child-oriented, and (d) comprehension questions were felt to be poorly constructed.

The IRI was designed to have equivalent forms each containing 14 passages ranging from first through fourteenth grade level. Both narrative and expository passages were chosen for inclusion in Forms A and Forms B of the IRI. Passages were obtained from a variety of resources that are typically used with adult basic education students and students enrolled in college reading classes. The Fry readability formula (Fry, 1977) was applied to each passage to determine its approximate readability level.

Since text length was a variable of interest in this study, each passage on Form B was designed to be approximately 80 percent longer than its corresponding Form A passage. An

exception was the selection of passages for grade level one. The two grade level one passages containing a little over 100 words were deliberately chosen to be short because we did not want to discourage the adult beginning reader with entry level passages that were too long. Each form had six groupings for text length. Grade level one was designed to be about 100 words on both forms. Grade levels two and three were grouped together to have approximately the same length, as well as grade levels four, five, and six; grade levels seven, eight, and nine; grade levels ten, eleven, and twelve; and grade levels thirteen and fourteen. Each grouping was designed to increase in text length to insure that readers produced sufficient miscues to be analyzed.

Ten comprehension questions were written for each passage in both forms. Questions were paraphrased so that there were no verbs, nouns, or modifiers in common to text information (Anderson, 1972; Rupley & Blair, 1983). After the ten questions for each of the 28 selections were constructed, they were randomly ordered to address the possibility that an answer to a question may be revealed by a previous question (Pyrczak & Alexrod, 1976).

To check for passage dependency, the 270 questions were given to a class of 30 students enrolled in an undergraduate reading methods course. Only the questions were given to the class in groups of 30 questions at a time until the students had answered all 270 questions. When a question was answered correctly by 30 percent or more of the students it was rewritten until it met the criterion of fewer than 30 percent getting an

answer correct.

Literal, inferential, and critical outcome questions were designed for the instrument. A group of five reading professors in a major Texas university was asked to categorize each question as either literal, inferential, or critical. Each question had to receive at least 60 percent agreement among the professors to classify it into one of the three categories. Questions were edited and revised until each one met the criterion.

A pilot study was conducted with 15 freshmen students enrolled in a university reading and study skills course and two adult basic education students enrolled in a County Adult Education Cooperative. Based upon these subjects' performance a Pearson-product-moment correlation was computed for word recognition levels and comprehension levels using Powell's (1974) criteria for reading competence levels between the two forms of the IRI. The correlation coefficient for word recognition levels was 0.92 and for comprehension levels the coefficient was 0.76.

The results of the correlation computations were deemed satisfactory. Since corresponding passages across forms did yield approximately the same percentage of miscues, it was determined that both forms would generate sufficient miscues for the study. Although there was greater variation among grade levels for comprehension levels, this information supported our belief that many factors influence the comprehension of a passage other than sentence length and the number of multisyllabic words contained in a passage, which is what the readability formula measured.

In addition to pilot testing the IRI, other materials were also pilot tested. A structured interview intended to provide

information about each reader's concept of reading, hours spent reading per week, bilingualism, length of time out of public school setting, and age was used in the pilot study. A major concern in the pilot testing was whether an interviewing technique could be used to stimulate each reader to reflect on each selection read and identify the one that was the most interesting and the one that was the least interesting for each form of the IRI and for all passages read when both forms were combined. The interview also focused on having each reader rate his/her familiarity with the content and style of each passage read on a scale of one (low) to five (high). It was found that readers could provide such information and that they were consistent over time in identifying the most and least interesting passages, and rating their familiarity with both the content and style of passages read.

Finally, the Lorge-Thorndike Intelligence Test and the word list from the Wide Range Achievement Test (Jastak, Bijou & Jastak, 1965) were also administered to each subject. The intelligence test was selected because it yields a measure of both verbal and nonverbal intelligence. The word list served as estimate of each subject's reading instructional level and this score was used to select the entry level IRI passage for each subject to begin reading.

Procedure

During the initial group meetings for 3 to 15 subjects, the Lorge-Thorndike Intelligence Test was administered. These initial small group sessions lasted about one and one-half hours;

approximately 65 minutes to administer the intelligence test and 30 minutes for directions. Individual follow-up sessions for each subject were scheduled after testing.

Before individual sessions began, half of the subjects were randomly assigned to begin reading in Form A and half to begin reading in Form B of the informal reading inventory. When subjects arrived the structured interview was conducted to obtain information regarding age, hours spent reading per week, concept of reading, and primary language. After completion of the interview the word list was administered to estimate the level of the first passage the subject read in the IRI. Subjects were then given a passage to read at the grade level indicated by their performance in the word list.

Subjects read orally each of the passages into a tape recorder and at the end of orally reading each passage they were asked the ten comprehension questions. The questions were asked orally and the oral responses of the reader were tape recorded. The percentage of correct responses were computed. The researcher determined by the use of Powell's criteria (1974) if the selection was at the subject's independent, instructional, or frustration level. Subjects were given the next higher level passage to read until their comprehension score reached frustration level on two consecutive passages. The first passage labled frustration level was used for data analysis. If neither independent nor instructional levels was found, then subjects read passages of lower readability until the independent and/or instructional levels were identified. Some subjects scored at the independent level on the most difficult selection. Other

subjects read a selection at the independent level and the following two passages at the frustration level. In such a case, there was no instructional level identified.

Subjects were then asked to rate their familiarity with the topic and the style of the passage just read. The following questions and directions were used to guide the subject into making a decision about how familiar he/she was with the passage topic or content.

1. How much do you know about this subject? Have you ever been in a situation like this before?
2. Have you ever seen anything on television about the subject or event, heard about it from someone, read about it, or experienced it?
3. If you have never read about it, heard about, or experienced it before, then you would want to choose a rating of 1. If you feel you know a lot about the topic, then you would want to choose a rating of 5. Or you may feel that your familiarity of the topic or situation is somewhere between knowing absolutely nothing to knowing a great deal; where would it be on a scale of 2, 3, or 4?

The researchers restated the choices orally and provided a visual display of the continuum of choices in case the reader had difficulty conceptualizing the scale. The researcher recorded the responses.

Subjects were then asked the following questions to determine their familiarity with the style of writing:

1. How familiar are you with this style of writing?
2. Was it easy for you to read or difficult due to the way the author organized the passage?
3. Do you often read many passages that are organized in this manner?
4. How much is this author's writing style similar to what you read?
5. If you have never read any material that is organized and written like this passage, you would select a 1. If you feel that you often read material that is similar to the passage you read, you should choose a 5. Or you may feel your familiarity with this style of writing is neither a 1 nor a 5, but somewhere between the two numbers. Would it be a 2, 3, or 4?

Researchers restated the choices orally and provided a visual display of the continuum of choices, and the subject's responses were recorded.

When the subjects completed the readings on the short or long form of the IRI, they were asked a series of questions designed to measure their interest in the selection. Each subject was asked to select the most interesting selection read and the selection which was the least interesting.

Before leaving the second session, subjects were asked to schedule a second individual session within the time frame of one week. This was done to control for the effect of instruction received from any classroom experiences. Upon arrival to the second session, subjects were given the alternate form of the IRI to read. The researcher presented the subject the passage that

corresponded to the instructional level of the first form. The process that was used in the first session was then repeated to determine the reader's independent, instructional, and frustration levels on the alternate form. The processes of determining the degree of familiarity with the topic and style and level of interest were identical to that utilized during the first session.

At the end of the second individual session, the researchers sought confirmation of the subject's interest in the passage. The choices that the reader had made earlier on both Forms A and B were restated for the subject. Subjects were then asked to prioritize their selections. They had to choose the most interesting and least interesting passage out of all passages read. Their responses were catagorized as follows for data analysis: (1) a rating of "4" was given to the passage in which the subject expressed the most interest, (2) a rating of "3" was assigned to the passage if the reader verbalized interest, (3) a rating of "2" was assigned to the passage if the reader did not choose the selection as the most interesting, and (4) a rating of "1" was given to the passage if the reader had chosen the passage to be the least interesting.

Scoring the Informal Reading Inventories

Each oral reading session and comprehension check after the readings were taped on an audio tape recorder. As the subjects read the selections, their miscues were marked on a duplicate copy of the selection. The Reading Miscue Inventory (RMI) marking system was used to identify substitutions, omissions,

insertions, reversals, and repetitions (Goodman & Burke, 1972). The accuracy of recording miscues was checked by listening to the tape recorded readings and recording them on a coding sheet. Assistance was obtained from a certified reading specialists to listen to ten percent of the tapes and mark the miscues of the readers. Using the researchers' miscue scoring as the criterion, inter-rater agreement was 0.94.

The coding sheet was a modified version of the coding sheet found in the RMI. Researchers followed the suggestions in the manual. All miscues were listed on the coding sheet for analysis with the exception of repeated identical substitutions of nouns, verbs, adjectives, or adverbs. The miscue was listed only for the first occurrence if the miscue had retained the same grammatical function. If its grammatical function had changed, it was listed as an additional miscue.

This study differs from most miscue analysis studies that have historically analyzed only the first 25 miscues. One of the variables of interest examined was the the effect of text length on readers' miscues. Text length was examined by comparing the readers' performance on varying portions of the text. Hypothesizing that as readers' process text they can build schemata for the enhanced comprehension of textual information; therefore, making fewer miscues that interfere with comprehension as they read farther into the text. Text length was examined by comparing the readers' performance on varying portions of text. Therefore all miscues were analyzed.

Each miscue was analyzed by examining its graphophonic acceptability, syntactic acceptability, and semantic

acceptability. In addition, each miscue was examined to determine if it had been corrected, resulted in loss of meaning, and corrected when it had resulted in loss of meaning. The following paragraphs provide a brief summary of the procedure.

Graphophonic Acceptability

Graphophonic acceptability was determined by analyzing the graphic and sound similarities of a miscue and it expected response. A "Y" was coded if there was a high degree of similarity. This was determined by examining three parts of the word--the beginning, the middle, and the end. If two parts of the miscue and expected response were alike in either way--they looked alike or sounded alike--then they were considered to have a high degree of similarity. A "P" for partial similarity was coded if only one part looked or sounded alike. If there were no parts that were similar, then "N" was coded for no degree of similarity. The miscue "agent" for "agency" was coded as a "Y." The miscue "man" for "mop" was coded as a "P." The miscue "drink" for "get" was coded as a "N."

Syntactic Acceptability

Syntactic acceptability was determined by analyzing whether or not the miscue occurred in a structure that was grammatically acceptable. A "Y" was coded if the sentence was totally acceptable within the whole text. A "P" was coded if the sentence was acceptable only within the context of the sentence or only a portion of the text. If the miscue resulted in a totally unacceptable sentence, "N" was coded. The reading of ". . . but it is doubtful that there may be bought much lower"

for ". . . but it doubtful that they may be bought much lower" would be coded "N." The reading of "The large dog jumped the fence and ran after the boy for "The large dog jumped the fence and ran after him would be coded "Y." Reading "Some general definition are . . ." for "Some general definitions are . . ." would be coded as "P."

Semantic Acceptability

Semantic acceptability was determined by analyzing whether or not the miscue occurred in a structure that was semantically acceptable. A "Y" was coded if a sentence was totally acceptable within the whole text. A "P" was coded if the miscue made sense within the sentence only or a portion of the sentence. The reading of "The old man walked to the garbage and then proceeded to get into his car." for "The old man walked to the garage and then proceeded to get into his car." would be coded as "P." An "N" was marked on the coding sheet if the miscue resulted in a totally unacceptable sentence. The reading of "Many gulls added to the nose." for "Many gulls added to the noise." would be coded "N."

Corrections

The researchers simply examined the marking system to determine if a miscue had been corrected. A "Y" for yes was recorded if the miscue had been corrected. A "P" for partial was recorded if there had been an unsuccessful attempt to correct or if the reader altered a correct response in the text. An "N" was noted when there had been no attempt to correct the miscue.

Meaning Change

Miscues were examined to determine if they had an effect on

meaning. A "Y" was marked when there was an extensive change in meaning. A "P" was recorded when there was a minimal change. An "N" was marked when no change in meaning was involved. The reading of "Mr. Jones was calling his secretary . . ." for "Mr. Jones called his secretary . . ." would be coded a "P." The reading of "Jan was hopping to read the book" for "Jan was hoping to read the book" would be coded "N."

Percentages of "Y," "P," and "N" responses were computed for each of the questions as well as the percentages of types of miscues. These percentages were computed for miscues of an entire selection as well as miscues for each quarter of a selection. The percentages computed as "Y" responses were used in data analysis.

Meaning Change Corrected

The percentage of miscues that had resulted in the loss of meaning and were corrected were determined by examining the coding sheet. The percentages were computed and recorded.

Data Analysis

Regression analysis procudures were used to examine the effect of the predictor variables (text length, interest, familiarity with topic, bilingualism, verbal intelligence, age, hours spent weekly reading, time out of school, and group membership) on each of the nine criterion variables (graphonic acceptability of miscues, syntactic acceptability of miscues, semantic acceptability of miscues, miscues resulting in meaning loss, corrected miscues, corrected miscues that had resulted in earlier resulted in meaning loss, literal compehension,

inferential comprehension, and critical comprehension). Comparisons of full versus restricted models were used to explore the unique and shared variance of the predictor variables.

Regression analysis and orthogonal contrast were utilized to examine the differences in performance for graphophonic acceptability, syntactic acceptability, semantic acceptability, corrections, meaning loss, and corrected meaning loss across four quarters of text.

Results

The full model R^2 values for each of the nine separate regression equations are reported in Table 1. Each of the regression models is a statistically significant model ($p < .05$). Models for predicting literal, inferential, and critical comprehension scores yield exceptionally high R^2 values (0.7902, 0.6820, and 0.5723, respectively).

Insert table 1 here

Restricted models were created by removing one predictor variable at a time from the full model. Pedhauzer (1983) formula was then applied to the information obtained from the full and restricted model, which is reported in Table 2. The F ratio was used to determine the unique contribution of each of the predictor variables to each of the nine models.

Insert table 2 here

A summary of the significant contributions of each predictor

variable in the nine models is presented in Table 3. An examination of the summary reveals that interest, familiarity with style, familiarity of topic, bilingualism, conceptualization of reading, verbal intellegience, group membership (ABE, HRF, or SEM) and age are not as effective in predicting the criterion variables as reading maturity, non-verbal intelligence, time out of school, hours spent reading per week, and readability.

Insert table 3 here

Although Table 3 is interesting to examine, it may be misleading, for an examination of Table 4 shows that there are several predictor variables that are highly correlated. One example that is revealing is that the predictor variable, group membership, is significantly correlated ($p < .05$) with all the other predictor variables. Therefore, when group membership is removed from the model, it is likely that the variable would not be missed in most of the models as Table 3 reflects. The predictor variables are not independent and, therefore, share varianace.

Insert table 4 here

The intercorrelation matrix for criterion variables presented in Table 5 provides information about the relationship between the predictor variables. Syntactic and semantic acceptability are highly correlated. Graphophonic acceptability inversely correlates with the comprehension criterion measures of meaning loss, corrected meanining loss, literal comprehension,

inferential comprehension, and critical comprhension. Miscues resulting in meaning loss inversely correlate with comprehension scores, and significantly correlate with literal comprehension scores.

Insert table 5 here

Correlations between the predictor and criterion variables are reported in Table 6. Positive interest in a passage selection and high degree of familiarity with the passage topic and author's style correlate significantly with comprehension scores. Both verbal and non-verbal intelligence scores correlate positively with the measures of comprehension.

Attention is also drawn to the variable of readability. the correlations between readability and the criterion measures reveal that when a selection was at frustration level, the semantic acceptability, syntactic acceptability, percentage of corrections, and corrected miscues resulting in earlier loss of meaning were lower than for independent and instructional levels. Miscues tended to graphophonically acceptable when subjects performed at frustrational level. The significant correlation of .240 with meaning loss indicates that when the subjects read at frustration level, their percentage of miscues resulting in meaning loss increased.

Since so many predictor variables correlated significantly with each other (Table 4), it was decided to use commonality analysis to further examine the shared effect of variables on the criterion measures. Variables were conceptually classified and

grouped according to logical relationships.

The predictor variables bilingualism, age, group membership, time out of school, and hours reading per week were grouped conceptually as demographic variables. Reading maturity and readability were grouped together because they are both text variables. The measures of verbal and nonverbal intelligence were grouped together. Three variables that reflected reader-text interaction--interest, familiarity with author's style, and familiarity with the content or topic of a reading passage--were clustered for analyses. Hours reading per week and conceptualization of the reading process were grouped together. A rationale for grouping these two variables was that both variables attempt to measure the readers' insights into their own reading behavior. It has been generally accepted that it takes time and practice to conceptualize what is happening in the reading process.

Table 7 shows the results of removing the specified conceptual grouping of variables from the full model. The predictor variables of reading maturity and readability had the most effect on semantic acceptability, syntactic acceptability, meaning loss, literal comprehension, and critical comprehension. Bilingualism, age, group membership, time out of school, and hours spent reading per week collectively affect the graphophonic acceptability and corrected meaning loss regression models.

Insert table 7 here

Although the subjects' performance on the long and short

forms of the informal reading inventory were compared a decision was made to examine text length as Menosky (1971) had done. Criterion measures were computed across four quarters of text to examine changes that occurred as readers proceeded through the reading of the text. Orthogonal contrasts were used to examine the differences between the means of the criterion measures for four quarters of text. The significant contrasts are presented in Table 8.

Insert table 8 here

Subjects' miscues lost semantic acceptability between the first and second quarters of the text. Subjects' miscues varied in semantic acceptability across text on the long form as well, but the scores improved in the second and third quarters. Meaning loss significantly decreased across text. Another significant comparison is the significant increase of corrections made by the college seniors in the last quarter of text. The high risk freshman (HRF) subjects also demonstrated some changes in reading behavior. Their performance measured by the criterion variables of graphophonic acceptability and syntactic acceptability indicated that there was a sudden drop in scores for the third quarter of text.

Discussion

The data in this study do not support the idea that as readers mature their percentage of graphophonically acceptable miscues increase initially and that syntactically and semantically acceptable miscues increase with reading proficiency

(Biemiller, 1970; Boraks, 1978; Raisner, 1978). The readability of selections, rather than the reader's capabilities, was found to be the most important influence on readers' strategies. Subjects reading a selection at their independent level tended to correct more miscues, produced fewer miscues that resulted in meaning loss, corrected a higher percentage of miscues resulting in maeaning loss, and produced a higher percentage of semantically acceptable miscues. Adult readers' miscues do not appear to be a function of developmental stages as much as the readers' ability to process print of specific types of text. There was no apparent pattern of strategy changes across the grade level passages.

A clearer picture of miscue patterns is revealed in a study of readers' progression through the text. The percentage of graphophonically acceptable miscues, semantically acceptable miscues, corrected miscues, and corrected miscues that had resulted in an eaarlier loss of meaning increased across text, and semantic acceptability remained stable while meanining loss from miscues decreased across text. Although no significant differences were found between the quarters of the text for the six criterion measures, a pattern emerged. Readers appeared to use information gained from the initial portion of the text to improve their strategies. Readers could either be building or activitating language and meaning schemata from the earlier text portions to refine their reading strategies or selecting important and relevant text elements as they process the text (Goetz, Schallert, Reynolds, & Radin, 1983; Meyer, 1975). Thus,

as the subjects processed additional text they began to use reading strategies associated with the vocabulary, concepts, and contextual features of the passage. This idea becomes credible when one notes the subjects' tendancy to correct miscues that influenced comprehension, resulting in a lower percentage of meaning loss miscues within passages.

The three predictor variables of interest in text passage, familiarity with text topic, and familiarity with author's style are directly concerned with readers' background knowledge for passages. We speculated that if readers were highly interested in a passage and knowledgeable of the topic and the text features (author's style), then these would directly influence performance related to decoding strategies and comprehension performance (Adams & Bruce, 1980; Anderson, Reynolds, & Goetz, 1977; Raphael, Myers, Freebody, Tirre, & Fritz, 1980; Rumelhart & Ortony, 1977; Schallert, 1980). Interest shared its effect with familiarity with topic and familiarity with author's style on subjects' performance on measures of graphophonic acceptability, meaning loss, correction of miscues that had earlier resulted in meaning loss, and all three comprehension measures (literal, inferential, and critical). Although interest shares its effect, its unique effect was significant only in predicting semantic acceptability. Familiarity with topic provided unique variance for measures of graphonphonic acceptability, corrections, meaning loss, literal comprehension, and inferential comprehension. Readers used less graphic information with more familiar text which adds further support for an interactive conceptualization of reading, suggesting that adult readers rely less on text features when

reading about familiar information. This idea is further supported by the subjects producing fewer miscues that were deterimental to comprehension when they were reading familiar text. Familiarity with style had a significant unique effect on meaning loss and inferential comprehension and significant correlations with meaning loss, correction of meaning loss miscues, and all three measures of comprehension. Familiarity with style did not significantly affect the utilization of the cueing system, but did have an effect on meaning loss and the correction of miscues that had earlier resulted in meaning loss. These findings support the belief that familiarity with the structure or structures of a reading selection facilitates comprehension (Collins & Smith, 1980; Spiro & Taylor, 1980).

Another variable that is directly associated with readers' use of text processing strategies and comprehension of text is conceptualization of reading. Conceptualization of reading uniquely influenced syntactic and semantic acceptability as well as inferential comprehension. Readers who reported reading primarily as a comprehension process scored higher on critical comprehension measures and corrected fewer miscues. Evidently these subjects gave more attention to the processing of ideas rather than the graphic cueing system. In addition, the group that viewed reading as a comprehension process performed considerably higher on both inferential and critical comprehension measures. Although it is difficult to sort out the actual impact of this variable due to conflicting results from different analyses, it is apparent that the variable influenced

both strategies and comprehension performance.

The variables of readability and reading maturity in the commonality analyses confirmed that both shared variance and were significant contributors to all of the regression equations. The results indicated that the readability of a selection for a given reader was the most important variable investigated. However, it is obvious that readability of a selection would directly influence subject's comprehension performance because these scores were used to define readability. However, it is interesting to note that there were differences in correction strategies in terms of readability level of text passages (independent, instructional, frustration). More correction were noted for the independent level. Variations in meaning loss were also noted across readability levels. Meaning loss was considerably higher for the second quarter of text for the frustration selection. The independent level selections yielded a considerably higher percentage of corrected miscues that had earlier resulted in loss of meaning in the second quarter than frustration level selections. Reading maturity as defined by subjects' reading performance levels provided significant unique contribuions to all nine regression models. Significant correlations for reading maturity and the criterion variables of syntactic acceptability, literal comprehension, and critical comprehension. It might be expected from Wixson's (1979) findings that the emergence of developmental patterns for the strategies would have caused variation across the passage grade levels. Wixson suggested that graphophonic acceptability would increase at early stages of reading and then stabilize;

therefore, semantic acceptable and syntactic acceptable miscues would increase through the grade level passages. However, subject's performance in this study varied dramatically from grade level to grade level on the passages. The fairly high consistent rank for reading maturity's unique contribution lends credibility to the liklihood that subjects' performance in this study did not reflect a developmental view of reading strategies, but that text factors and subjects' background contribute more to the use of a given strategy.

The analyses for the demographic variables of bilingualism, age, group membership, time out of school, and hours reading per week yielded some interesting findings. The effect of bilingualism on the criterion variables should be interpreted cautiously because most of the bilingual participants were in the Adult Basic Education (ABE) sample. For this group bilingualism influenced their correction strategies and literal comprehension. Bilingual subjects made fewer corrections, which could possibly be attributed to their focus on text elements rather than meaning. This group also scored lower on comprehension measures than did the monolingual English speaking subjects. This finding makes sense when one considers that fewer attempts to self-correct is an indication of attention be given to text features rather than processing the text to reveal meaning. Group membership obviously influenced grade level performance on the informal reading inventory. As noted earlier, the ABE subjects produced more frustrational selections and the senior college subjects produced more independent selections. This phenomenon

explains the apparent variation in literal, inferential, and critical comprehension scores. However, in terms of strategies, the high risk freshmen college subjects utilized all strategies less efficiently than either of the other two groups. It could certainly be argued that the ABE subjects were the less proficient readers, yet their strategies were similar to the college seniors. It is possible that the non-proficient freshmen readers were not able to utilize the strategies examined in this study as well as more sophisticated strategies that are needed to meet the task demands for the level of text that they read. The remaining two demographic variables, time out of school and hours reading per week, contributed unique variance to semantic acceptability and corrections. However, these results are most likely spurious due to the fact that the ABE subjects exhibited the most variation for these variables and both variables are significantly correlated with group membership.

Summary

Several conclusions can be drawn from this study. First, this study suggests that adult readers rely more on graphophonic and syntactic cues than they rely on semantic cues. There was a wide variation in miscues produced by the adult subjects, which appears to be a result of the interaction of text and reader variables. When a text selection became difficult for a reader, the readers' strategies changed; thus, producing the greater use of graphophonic and syntactic cues, which resulted in a higher percentage of meaning loss and fewer incidences of correcting the errors. These reading behaviors confirms Wixson's (1979) summary of findings that miscues are not static, but vary as a function of a

combination of factors; one of which is text difficulty.

Second, this study supports the concern expressed by many researchers (Davison, Kantor, Hannah, Hermon, Lutz, & Salzillo, 1980; Dawkins, 1975) that readability is much more complex than sentence length, number of multisyllabic words, and other traditional measure of readability. An examination of the grade level performances revealed that the subjects often yielded different independent, instructional, and frustration levels for the two forms of the informal reading inventory. Readability appears to be more than what readability formulas are able to measure. Subjects variation in reading performance levels adds further support to the belief that readability is interaction of text and reader variables. Background knowledge (familiarity with text topic and author's style) facilitated a readers' performance even when text features indicate that a passage should be at a difficult reading level.

Third, this study advances the idea that adult readers utilize all three cueing systems (graphophonic, syntactic, and semantic) as they read text. Adult readers in this study altered their reading strategies when they were engaged in text of varying degrees of difficulty for them. This study supports that a portion of this variance is due to the participants' interest in the text, familiarity with the topic, and familiarity with the style of the text. Membership in one of the groups in this study and characteristics that define the groups have some effect on

their performance, but variance in reading strategies does not offer support for developmental stages of changes in adult reading strategies.

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TABLE 1

Multiple R^2 Value of Regression Models

Criterion Variable	R^2	F Ratio	p
Semantic Acceptability	.3195	1.46	.0467
Syntactic Acceptability	.3195	1.46	.0467
Graphophonic Acceptability	.4084	2.15	.0003
Corrections	.4430	2.47	.0001
Meaning Loss	.3905	1.99	.0010
Corrected Meaning Loss	.4349	2.11	.0005
Literal Comprehension	.7902	12.03	.0001
Inferential Comprehension	.6820	6.85	.0001
Critical Comprehension	.5723	3.67	.0001

[a]The full models for each of the criterion variables contains the following predictor variables: text length, interest, familiarity with style, familiarity with topic, bilingualism, reading maturity, nonverbal intelligence, verbal intelligence, conceptualization of reading, group memberships, age, time out of school, hours reading per week, and readability.

TABLE 2

Multiple R^2 Value of Restricted Regression Models

Predictor Variable Removed	Criterion Variable								
	Semantic Acceptability	Syntactic Acceptability	Graphophonic Acceptability	Corrections	Meaning Loss	Corrected Meaning Loss	Literal Comprehension	Inferential Comprehension	Critical Comprehension
Text Length	.3193	.3184	.3994	.4381	.3821	.4349	.7900	.6816	.5692
Interest	.2981	.3176	.3975	.4420	.3899	.4283	.7854	.6811	.5579
Familiarity with Style	.3106	.3181	.3932	.4330	.3678	.4291	.7890	.6623	.5345
Familiarity with Topic	.3134	.3134	.3733	.4300	.3762	.4234	.7815	.6745	.5654
Bilingualism	.3193	.3163	.4075	.4027	.3881	.3956	.7902	.6782	.5712
Reading Maturity	.2088	.2332	.3091	.3623	.2764	.3245	.7602	.5581	.5106
Nonverbal Intelligence	.3128	.3168	.3754	.4355	.3905	.4348	.7876	.6791	.5704
Verbal Intelligence	.3252	.3252	.3409	.4260	.3350	.3559	.7776	.6960	.6129
Conceptualization of Reading	.3028	.3029	.3993	.4426	.3869	.4346	.7867	.6748	.5577
Group Membership	.3084	.3076	.3076	.3953	.3788	.4291	.7899	.6591	.5645
Age	.3171	.2912	.3872	.4316	.3873	.4293	.7901	.6741	.5647
Time out of School	.2983	.2619	.3331	.3883	.3427	.3983	.7523	.6606	.5467
Hours Reading Per Week	.3011	.3062	.3915	.4156	.3703	.4009	.7857	.6612	.5639
Readability	.3153	.2880	.3819	.4276	.4225	.3629	.5296	.4887	.4351

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TABLE 3

Summary of Significant Unique Contributions to the Regression Models

Predictor Variable	Criterion Variable								
	Semantic Acceptability	Syntactic Acceptability	Graphophonic Acceptability	Corrections	Meaning Loss	Corrected Meaning Loss	Literal Comprehension	Inferential Comprehension	Critical Comprehension
Text Length									
Interest	x						x		x
Familiarity with Style					x			x	x
Familiarity with Topic			x	x	x		x	x	
Bilingualism				x		x		x	
Reading Maturity	x	x	x	x	x	x	x	x	x
Nonverbal Intelligence			x						
Verbal Intelligence			x	x	x	x	x	x	x
Conceptualization of Reading	x	x						x	x
Group Membership			x	x				x	
Age		x	x					x	
Time out of School	x	x	x	x	x	x	x	x	x
Hours Reading Per Week	x		x	x	x	x	x	x	x
Readability		x	x	x	x		x	x	x

$p < .05$

TABLE 4

Intercorrelation Matrix for Predictor Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Interest	1.000												
2. Familiarity with Style	.435*	1.000											
3. Familiarity with Topic	.232*	.435*	1.000										
4. Bilingualism	.081	-.010	.040	1.000									
5. Reading Maturity	.015	.091	.021	-.328*	1.000								
6. Verbal Intelligence	.083	.114	.015	-.096	.579*	1.000							
7. Nonverbal Intelligence	.117	.192*	.025	-.015	.686*	.724*	1.000						
8. Conceptualization of Reading	.021	.205*	.065	-.021	.312*	.353*	.344	1.000					
9. Group Membership	-.089*	-.207*	.184*	.184*	-.830*	-.736*	-.795*	-.359*	1.000				
10. Age	.089	-.058	.304	.330*	-.216*	-.220*	.155*	-.106	.144*	1.000			
11. Time out of School	.032	-.062	-.076	.313*	-.565*	-.503*	.341*	.199*	.629*	.557*	1.000		
12. Hours Reading Per Week	.051	.107	.004	.029	.350*	.308*	.252*	-.088	-.376*	.029	.249*	1.000	
13. Readability	-.268	.000	-.236*	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.000

* $p < .05$

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TABLE 5

Intercorrelations Matrix for Criterion Variables

Variable	1	2	3	4	5	6	7	8	9
1. Graphophonic Acceptability	1.000								
2. Syntactic Acceptability	.070	1.000							
3. Semantic Acceptability	.066	.551*	1.000						
4. Corrections	-.100	.150*	.089	1.000					
5. Meaning Loss	-.076	-.169	.089	.008	1.000				
6. Corrected Meaning Loss	-.000	.149	.238*	.658*	-.142*	1.000			
7. Literal Comprehension	-.115	.190*	.187*	.091	-.227*	.097	1.000		
8. Inferential Comprehension	-.145*	.111	.066	.052	-.062	.019	.509*	1.000	
9. Critical Comprehension	-.143*	-.026	.019	.025	-.133	.039	.565*	.479*	1.000

* $p < .05$

TABLE 6

Correlations Between Predictor and Criterion Variables

Predictor Variable	Criterion Variable								
	Semantic Acceptability	Syntactic Acceptability	Graphophonic Acceptability	Corrections	Meaning Loss	Corrected Meaning Loss	Literal Comprehension	Inferential Comprehension	Critical Comprehension
Interest	-.057	.017	-.075	.076	.017	.187*	.280*	.168*	.266*
Familiarity with Style	.102	.097	-.046	.056	-.203	.146*	.236*	.198*	.379*
Familiarity with Topic	.016	-.009	-.140	-.123	-.105	.043	.258*	.216*	.216*
Bilingualism	.075	-.003	.025	-.163	-.025	-.050	-.072	-.205*	-.029
Reading Maturity	-.086	.149*	.000	.099	.068	.004	.137*	.330*	.175*
Nonverbal Intelligence	.002	.092	.047	.155*	-.008	.131	.232*	.317*	.170*
Verbal Intelligence	.010	.147*	.013	.217*	-.036	.121	.233*	.285*	.127
Conceptualization of Reading	.003	-.056	.012	-.105	-.103	-.055	.045	.120	.149*
Group Membership	-.008	-.111	-.002	-.090	.027	-.090	-.215*	-.318*	-.260*
Age	.078	-.066	.012	.027	-.076	.071	-.051	-.114	-.075
Time out of School	.048	-.026	.076	-.052	-.041	.078	-.111	-.293*	-.197
Hours Reading Per Week	-.015	.045	-.022	.098	-.002	.140*	.066	.086	.086
Readability	-.191*	-.224*	.117	-.177*	.240*	-.192*	-.844*	-.618*	-.640*

*$p < .05$

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TABLE 7

Multiple R^2 Value of Restricted Regression Models of Conceptual Groupings of Variables

Predictor Variables Removed	Criterion Variable								
	Semantic Acceptability	Syntactic Acceptability	Graphophonic Acceptability	Corrections	Meaning Loss	Corrected Meaning Loss	Literal Comprehension	Inferential Comprehension	Critical Comprehension
Reading Maturity Readability	.1685	.1725	.2696	.3235	.1982	.2951	.3331	.3462	.2598
Bilingualism Age Group Membership Time out of School Hours Reading Per Week	.2510	.2071	.1742	.2516	.2998	.2900	.7756	.6190	.4930
Verbal Intelligence Nonverbal Intelligence	.3187	.3241	.3312	.4223	.3349	.3558	.7772	.6949	.6106
Interest Familiarity with Style Familiarity with Topic	.2837	.3083	.3348	.4125	.3439	.3976	.7726	.6510	.5058
Hours Reading Per Week Conceptualization of Reading	.2888	.2910	.3304	.4132	.3660	.3980	.7821	.6572	.5477

TABLE 8

Summary of Significant Contrasts for Quarters of Text for Readability, Reading Length, and Group Membership

Variable	F Ratio	p	Contrasts					
			First-Second p	First-Third p	First-Fourth p	Second-Third p	Second-Fourth p	Third-Fourth p
Short Form								
Semantic Acceptability	3.05	.03	.026					
Long Form								
Semantic Acceptability	3.05	.03		.004	.043			
Meaning Loss	3.61	.01		.003	.043	.037		
Senior Reading Class								
Corrections	2.91	.04						.006
Freshmen								
Graphophonic Acceptability	3.07	.02		.004		.050		.026
Syntactic Acceptability	4.35	.01		.004		.006		.002

$p < .05$

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